A CULTURAL RESOURCES RECONNAISSANCE OF POSSIBLE DREDGE SPOIL DISPOSAL SITES, CHARLESTON HARBOR, SOUTH CAROLINA

Prepared for

SOUTH CAROLINA COASTAL COUNCIL

and

U.S. ARMY CORPS OF ENGINEERS- CHARLESTON

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ABSTRACT

Future operation of Charleston Harbor will require the continued dredging of navigation channels into and within the Harbor. Continued use existing disposal sites for dredged materials on Daniel Island will not be possible in the near future. Alternate disposal sites to replace the Daniel Island facilities are being sought by the U.S. Army Corps of Engineers and the South Carolina Coastal Council. This report provides an assessment of the potential for the construction, maintenance, and operation of 19 prospective locales on known or potential cultural resources. This assessment involved the identification of all known resources within or adjacent to the potential disposal sites, an assessment of the kinds of effects that the proposed facilities would create, and the ability of these effects to detract from the significance of any National Register of Historic Places listed, eligible, or potentially properties. A ranking system was developed to order the possible disposal sites with respect to their ability to affect cultural resources. This ranking can then be employed in the ongoing process of selecting the best site(s) for spoil disposal when all factors are considered.

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CHAPTER I

INTRODUCTION

Brockington and Associates, Inc., undertook an assessment of the potential effect of the construction and operation of nineteen possible dredge spoil disposal sites on cultural resources for the South Carolina Coastal Council and the U.S. Army Corps of Engineers, Charleston District. This assessment was undertaken to provide planning information for the selection of a disposal site(s) that will have optimal minimum effects on all environmental, cultural, and economic resources in the Charleston Harbor area.

Continued operation of Charleston Harbor for both commercial and military ship traffic requires the dredging of navigation channels into and within Charleston Harbor. Existing dredge spoil disposal sites on Daniel Island, located between the Cooper and Wando Rivers at the north center of the Harbor, will not be available in the near future. Use of alternate disposal sites will be necessary to maintain the current navigation ways and mooring facilities the Harbor. Nineteen potential disposal sites have been selected by the U.S. Army Corps of Engineers and the South Carolina Coastal Council as possible alternatives. These nineteen sites are located in and around the Harbor and include existing disposal sites in Charleston and Berkeley Counties, new upland and marsh sites in Charleston and Berkeley Counties, underwater disposal sites in the Harbor, and offshore disposal areas in both State and Federal waters. Figure 1 displays the location of each possible disposal site. Table 1 lists each site by name and describes its current setting and condition.

This report presents a brief description of the natural setting of the Charleston Harbor area and an overview of the cultural setting evidenced in the region in Chapter II. Chapter III presents a summary of the methods employed to gather information concerning cultural resources in or near the potential disposal sites, and to develop the ranking of sites by potential to affect these resources. Chapter IV summarizes the resources identified near each possible disposal site, describes the anticipated effects of the construction and operation of a disposal site, and provides an assessment of the potential of each possible disposal site to affect cultural resources. Chapter V presents a summary of the rankings of each possible disposal and presents recommendations based on the rankings developed in Chapter IV.


A
B
C
D
E
F
G
H
Q
R
I
S
J
K
L
M
N
North Charleston
Charleston
St Andrews
Mount Pleasant
Isle of Palms
Sullivans Island
CHARLESTON HARBOR
BERKELEY CO
CHARLESTON CO
FORT SUMTER NATL MON
PINE YORKTOWN STATE PARK

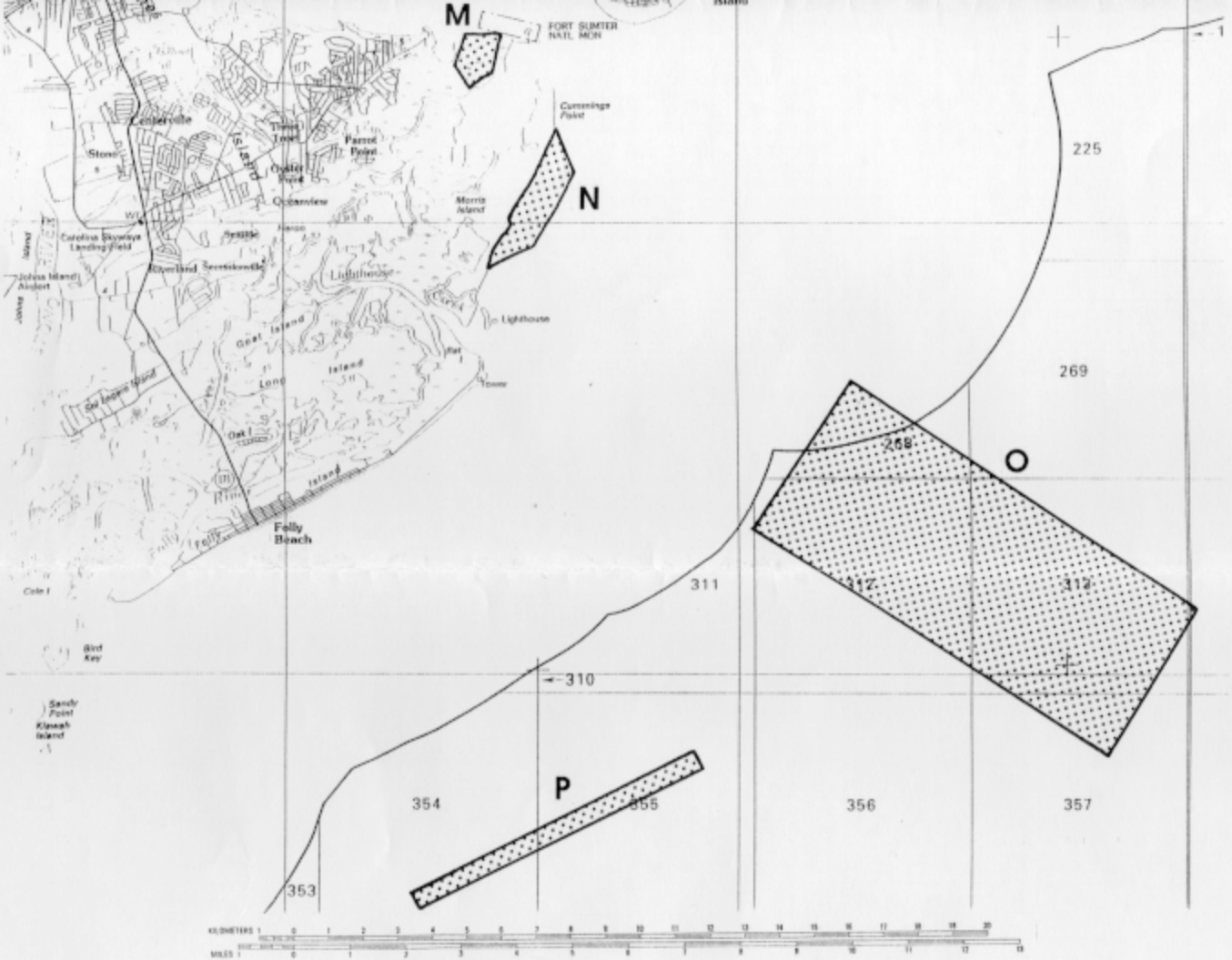

Figure 1. Charleston Harbor Region with the 19 possible disposal sites indicated.

Table 1. Summary of Possible Dredge Spoil Disposal Sites.

DISPOSAL SITE	NAME	PRESENT CONDITION/ CURRENT SETTING
A	Yellow House Creek	Existing disposal area on former marsh island
B	Naval Weapons Station	Existing disposal site on former marsh
C	TC Depot	Existing disposal site on former marsh
D	Upper Thomas Island	New location with 90% marsh and 10% upland
E	Clouter Creek	Existing disposal area on former marsh island
F	Lower Thomas Island	New location with 100% upland
G	Rodent Island	New location with 10% marsh and 90% upland
H	Parkers Island	New location with 100% upland
I	Old Landfill	Existing disposal area on filled marsh
J	Drum Island	Existing disposal area on former island
K	Patriots' Point	New location on existing dredge spoil
L	Middle Shoal	New location underwater in harbor
M	Fort Johnson	New location with 100% marsh
N	Morris Island	New location on beach
O	Ocean	Existing disposal area offshore
P	Folly Island Berm	New location offshore
Q	Cainhoy Road	New location with 100% uplands
R	Point Hope Island	New location with 100% uplands
S	Town Creek	New location underwater in harbor

CHAPTER II

NATURAL AND CULTURAL SETTING

THE CHARLESTON HARBOR REGION

Charleston Harbor occupies portions of central Charleston and southern Berkeley Counties, at the confluence of the Ashley, Cooper, and Wando Rivers (i.e., the Cooper River estuary, see Figure 1), in the Lower Coastal Plain of South Carolina. The Coastal Plain is characterized by a series of terraces formed by marine sediments deposited during the late Tertiary and Quaternary Periods. Most of the Charleston Harbor region lies on the most recent terraces (the Pamlico and the Talbot) that formed near the end of the Pleistocene Epoch (Long 1980:43).

Topography in the region generally consist of low ridges between the meandering channels of many streams that drain the Lower Coastal Plain. The ridges consist of sandy and loamy soils with more clayey soils and sediments occur in the drainages and marshes and swamps that border the streams. The coast above and below the Cooper River estuary consist of small to large barrier islands that form a portion of the Sea Island Complex in South Carolina (Kovacik and Winberry 1987:24). These low islands contain sandy uplands, derived from eolian and marine sediments generally dating from terminal Pleistocene or early Holocene fluctuations in sea level (i.e., the Pamlico Terrace described above). Networks of salt marshes, tidal flats, and small creeks have developed between the Sea Islands and the more interior landforms (Garrett 1983:7).

Although much of the Charleston Harbor region has been developed, extensive stands of maritime forest remain. Widmer (1976) presented a model of late prehistoric and early historic period vegetation patterns for the East Cooper area of Berkeley County. Widmer's model followed major vegetation types presented by Braun (1950), and included six major classes for that area:

Pine Savannah
Longleaf Pine Forest
Southern Mixed Hardwood Forest
Southern Hardwood Swamp
Freshwater Marsh
Tidal Marsh

Before intensive historic settlement and agricultural modification, the project tract probably contained a similar series of vegetation communities. Information on floral and faunal communities for the area is summarized from general sources such as Quarterman and Keever (1962) and Shelford (1963). Most of the extant woodlands today are mixed pine/hardwood forests. A mixed forest is more productive for faunal populations, and supports an active faunal community including deer and small mammals (e.g., various squirrels and mice, opossum, raccoon, rabbit, fox, skunk); birds (e.g., various songbirds,

ducks and wading birds, quail, turkey, doves, hawks, owls); and reptiles/amphibians (e.g., frogs, toads, lizards, snakes, turtles, alligator). Fresh and saltwater fish are abundant in the streams and marshes of the region, and shellfish are present in large numbers in most of the tidally affected wetlands throughout the region.

The climate of this area is subtropical, with mild winters and long, hot, and humid summers. The average daily maximum temperature reaches a peak of 80.1° F in July, although average highs are in the 80 degree range from May through September. A mean high of 46.8° F characterizes the coldest winter month, January. Average annual precipitation for Berkeley County is 47.3 inches, with most rain occurring in the summer months during thunderstorms; snowfall is very rare. The growing season averages 260 days, with first and last frosts generally occurring by November 2 and April 3, respectively. Although droughts do occur, they are rare, and the climate in general is very supportive of agriculture. Prevailing winds are light and generally from the south and southwest, although hurricanes and other tropical storms occasionally sweep through the area, particularly in the fall months (Long 1980:46,93-94).

Profound changes in climate and dependent biophysical aspects of regional environments have been documented over the last 20,000 years (the time of potential human occupation of the Southeast). Major changes include a general warming trend, melting of the large ice sheets of the Wisconsin glaciation in northern North America, and the associated rise in sea level. This sea level rise was dramatic along the South Carolina coast (Brooks et al. 1979), with an increase of as much as 100 meters during the last 20,000 years. At 10,000 years ago (the first documented presence of human groups in the region) the ocean was located from 50 to 100 miles east of its present position, and the project area was probably rather unremarkable Coastal Plain flatwoods. Sea level rise was steady from that time until about 5,000 years ago, when essentially modern levels were reached. During the last 5,000 years there has apparently been a 400 to 500 year cycle of sea level fluctuations of about two meters (Brooks et al. 1989; Colquhoun et al. 1981). Table 2 summarizes these more recent fluctuations in the region.

As sea level quickly (relatively) rose to modern levels, it altered the gradients of major rivers and flooded near-coast river valleys, creating estuaries like the Cooper-Ashley-Wando River mouths. These estuaries became great centers for salt water and freshwater resources, and thus population centers for human groups. Such dramatic changes certainly affected any human groups living in the region.

The general warming trend that led to the melting of glacial ice and the rise in sea level also greatly affected vegetation communities in the Southeast. During the late Wisconsin glacial period, until about 12,000 years ago, boreal forest dominated by pine and spruce covered most of the Southeast; by about 10,000 years ago, this forest was changing from coniferous to deciduous. The new deciduous forest was dominated by northern hardwoods such as beech, hemlock, and alder, with oak and hickory beginning to increase in number. With continuation of the general warming and drying trend, the oak and

Table 2. South Carolina Sea Level Curve Data.

CALENDAR DATE	SEA LEVEL	CONDITION
5,000 BC	6.5 m	In continuing rise
3,000 BC	4.5 m	Significant low stand
2,800 BC	1.5 m	High stand
2,500 BC	3.5 m	Low stand
2,200 BC	1.0 m	High stand
1,900 BC	3.2 m	Low stand
1,700 BC	0.8 m	Significant high stand
1,300 BC	4.0 m	Significant low stand
1,000 BC	1.0 m	High stand
800 BC	1.9 m	Low stand
600 BC	0.7 m	High stand
400 BC	3.0 m	Significant low stand
AD 300	0.4 m	High stand
AD 600	0.6 m	Low stand
AD 900	0.4 m	High stand
AD 1300	1.2 m	Low stand
AD 1989	0.0 m	In continuing rise

Data are interpolated from Brooks et al. (1989). Sea level is in meters below present high marsh surface.

hickory came to dominate, along with southern species of pine; oak and hickory appear from pollen data (Whitehead 1965, 1973; Watts 1970, 1980) to have reached a peak at 7000 to 5000 years ago. Since that time, the general climatic trend in the Southeast has been toward slightly cooler and moister conditions, and the present Southern Mixed Hardwood Forest as defined by Quarterman and Keever (1962) has become established.

Faunal communities also changed dramatically during this time. A number of dominating mammal species (e.g., mammoth, mastodon, horse, camel, giant sloth) became extinct at the end of the glacial period 12,000 to 10,000 years ago. Prehistoric human groups, which for subsistence had focused on hunting these large mammals, readapted their strategy to exploitation of smaller mammals, primarily deer in the Southeast.

PREHISTORIC CULTURAL OVERVIEW

The prehistory of coastal South Carolina has received much attention from archaeologists, and the present interpretations of that prehistory are presented in this section. Readers are directed to Anderson (1977), and Anderson and Logan (1981) for detailed overviews of previous research in the region. The following summary discussion is divided into periods which represent distinct cultural adaptations in the region; environmental changes that occurred in each period are also described.

Paleoindian Period (10000 - 8000 BC)

The earliest presence of man in the Coastal Plain of South Carolina occurred in the Paleoindian Period. This cultural period corresponds with the terminal Pleistocene, when climate was generally much colder than today, and when sea level was more than 200 feet below present levels. Although the project area was in the Coastal Plain during the Paleoindian Period, the distance to the ocean was much greater than at present. Another notable feature of the terminal Pleistocene was the presence of large mammalian species (i.e., megafauna).

The pattern of human adaptation for this period has been reconstructed from data from other areas of the country and from distributional data on diagnostic fluted projectile points found within the Southeast (Anderson 1990a). While many Paleoindian sites have been excavated in the Southeast (Anderson 1990b:174), only recently have South Carolina sites received attention. However, the data from surface finds of Paleoindian points seem to indicate that cultures of this period were focused along major river drainages, especially in terrace locations (Goodyear et al. 1989; Michie 1977; Goodyear 1979; Anderson and Logan 1981:13). If the pattern from other areas of the country holds true in South Carolina, then the adaptation was one of broad range, high mobility hunting and gathering with a possible focus on megafauna exploitation (Gardner 1974).

Paleoindian points have been recovered in the lower Coastal Plain (Goodyear et al. 1989; Michie 1977), but no intact sites have been documented. Apparently, only minimal Paleoindian use of the region occurred; populations were probably centered more on the coast, which was farther east at that time. The project area lacks the cryptocrystalline raw materials favored by the Paleoindian knappers (Goodyear et al. 1989; Goodyear 1979), and there are no known examples of Paleoindian projectile points produced using the locally available orthoquartzite.

Early Archaic Period (8000-6000 BC)

The Early Archaic corresponds to the adaptation of native groups to Holocene conditions. The climate in coastal South Carolina during this period was still colder and moister than at present, but an oak-hickory forest was establishing itself on the Coastal Plain (Whitehead 1965, 1973; Watts 1970, 1980). At this time, the woodland flora and fauna had become established. The Early Archaic adaptation in the South Carolina Lower Coastal Plain is not clear, as Anderson and Logan (1981:13) report:

> At the present, very little is known about Early Archaic site distribution, although there is some suggestion that sites tend to occur along river terraces, with a decrease in occurrence away from this zone.

Early Archaic finds in the Lower Coastal Plain are most typically corner- or side-notched projectile points, which have been determined to be Early Archaic through comparison with materials excavated at sites in other areas of the Southeast (Coe 1964; Claggett and Cable 1982).

Anderson and Hanson (1988) have offered a model of seasonal mobility for Early Archaic groups in South Carolina, which posits bands of 50 to 150 people along major drainage systems. The Charleston Harbor region is located within their Saluda/Broad band. Anderson and Hanson (1988) hypothesize that Early Archaic use of the Lower Coastal Plain was limited to seasonal (springtime) foraging camps and logistical camps; aggregation camps and winter base camps are hypothesized to have been near the Fall Line. Given the low overall population density, limited evidence of Early Archaic occupation is expected in the region.

Middle Archaic and Preceramic Late Archaic Period (6000-2500 BC)

The trends initiated in the Early Archaic (i.e., increased population and adaptation to local environments) continued through the Middle Archaic and Preceramic Late Archaic. Climatically, the study area was still warming, and an oak-hickory forest dominated the coast until circa 2000 BC, when pine became more prevalent (Watts 1970, 1980). Sites increased in size and density through the period, and stemmed projectile points and ground stone

tools are characteristic artifacts. Koob (1976) reported several sites from this period in Charleston and Berkeley Counties, generally represented by surface scatters of projectile points and flakes in plowed fields.

Blanton and Sassaman (1989) have recently reviewed the archaeological literature on the Middle Archaic Period. They document an increased simplification of lithic technology through this period, with increased use of expedient, situational tools. Furthermore, they argue that the use of local lithic raw materials is characteristic of the Middle and Late Archaic. Blanton and Sassaman (1989:68) conclude that "the data at hand suggest that Middle Archaic populations resorted to a pattern of adaptive flexibility as a response to" mid-Holocene environmental conditions such as "variable precipitation, sea level rise, and differential vegetational succession." These processes resulted in changes in the types of resources available changing from year to year.

Ceramic Late Archaic Period (2500-1500 BC)

By the end of the Late Archaic Period, two developments had occurred which changed the prehistoric lifeways on the South Carolina Coastal Plain. First, sea level had risen to within one meter of present levels, and the extensive estuaries now present were in place (Colquhoun et al. 1981). These estuaries were a reliable source of shellfish, and the Ceramic Late Archaic Period saw the first documented emphasis on shellfish exploitation. The second major development was the invention or adoption of pottery on the South Carolina coast.

It should be noted that the temporal/cultural border between the Ceramic Late Archaic and the Early Woodland has been subject to much discussion. Trinkley (1989, 1990) has recently argued that the Woodland Period begins with pottery production, and that there is no Ceramic Late Archaic. In contrast, Anderson et al. (1982) argue that the Ceramic Late Archaic is recognizable by either Stallings or Thom's Creek pottery. In the chronology presented in Table 3, the line is drawn circa 1500 BC, a time when production of fiber tempered pottery (Stallings) ceases, and a time when coastal midden sites change from large shell rings to smaller, dispersed middens. Unfortunately for regional researchers, there is not a direct equation between ceramic manifestation and cultural adaptation; Thom's Creek was a long lived tradition which spanned a period of major cultural and environmental change. When Thom's Creek pottery was produced within a generally Archaic system (Stallings and Thom's Creek I phases), it is considered a Ceramic Late Archaic manifestation. Subsequently, when Thom's Creek (and then Refuge) ware was produced within a more typically Woodland system, it entered the Early Woodland Period. Thom's Creek pottery has been recovered from two sites on Daniel Island (Trinkley and Tippett 1980:95).

As mentioned earlier, the Ceramic Late Archaic evidences the first archaeologically documented use of shellfish. In addition to the impressive shell ring sites of the South

Table 3. Regional Ceramic Sequence.

PERIOD	PHASE	DATE SPAN	CERAMIC TYPES
PROTOHISTORIC	Ashley [1]	AD 1550 - 1715	Ashley Complicated Stamped Mississippian Plain
LATE MISSISSIPPIAN	Pee Dee [1]	AD 1400 - 1550 [2]	Pee Dee Complicated Stamped Mississippian Plain
EARLY MISSISSIPPIAN	Jeremy [1]	AD 850 - 1400[3]	Savannah Complicated Stamped var Jeremy Savannah Check Stamped Burnished and Semi-Burnished Plain
LATE WOODLAND	Santee I	AD 700 - 850	Santee Simple Stamped [4] Deptford Fabric Impressed McClellanville Fabric Impressed [5] McClellanville Cord Marked [5] Wilmington Cord Marked
	McClellanville	AD 500 - 700	Deptford Cord Marked [6] Deptford Fabric Impressed [6] McClellanville Fabric Impressed McClellanville Cord Marked Wilmington Fabric Impressed Wilmington Heavy Cord Marked
MIDDLE WOODLAND	Deptford III	AD 200 - 500	Deptford Linear Check Stamped Deptford Simple Stamped Deptford Cord Marked Deptford Fabric Impressed Wilmington Heavy Cord Marked Wilmington Fabric Impressed Wilmington Check Stamped
	Deptford II	200 BC - AD 200	Deptford Linear Check Stamped Deptford Simple Stamped Hanover Fabric Impressed [7] Hanover Cord Marked [7] Yadkin Linear Check Stamp [8] Yadkin Fabric Impressed [8] Yadkin Cord Marked [8]
EARLY WOODLAND	Deptford I [9]	800 BC - 200 BC	Deptford Linear Check Stamped Deptford Simple Stamped Hanover Fabric Impressed Hanover Cord Marked
	Thom's Creek II [10]	1500 BC - 800 BC	Thom's Creek Plain Thom's Creek Reed Punctate Thom's Creek Jab and Drag Thom's Creek Shell Punctate Thom's Creek Simple Stamped Thom's Creek Incised Thom's Creek Finger Pinched Refuge Punctate Refuge Dentate Stamped Refuge Plain Refuge Simple Stamped Refuge Incised
LATE ARCHAIC [11]	Thom's Creek I	2000 BC - 1500 BC	Thom's Creek Plain Thom's Creek Reed Punctate Thom's Creek Jab and Drag Stallings Plain
	Stallings	2500 BC - 2000 BC	Stallings Plain

NOTE: The bracketed numbers refer to notes contained on the second page of this table. **SOURCES:** Anderson (1989, 1990a); Anderson et al. (1982); Blanton et al. (1986); Cable et al. (1991); Espenshade and Brockington (1989); South (1976); Trinkley (1981a, 1981b, 1989, 1990).

Table 3 Notes.

[1]. Detailed studies of large Mississippian site collections will eventually allow greater refinement of Mississippian chronology (see Cable et al. 1991:83).

[2]. The transition date from Savannah Comp Stamped var. Jeremy to Pee Dee is not well established; it is based on rim treatment chronologies from other areas (e.g., DePratter and Judge 1990).

[3]. A series of four radiocarbon dates from Buck Hall (38CH644) indicate that Mississippian Complicated Stamped pottery (Savannah, var. Jeremy) was present in the Forest by AD 850 (Poplin et al. 1992).

[4]. Research at Buck Hall (38CH644) indicates that Santee Simple Stamped was not contemporaneous with Savannah Complicated Stamped var. Jeremy (Poplin et al. 1992).

[5]. McClellanville textile decorate types may actually fall within the same technological series as Santee Simple Stamped, as defined by Anderson et al. (1982). Because of apparent temporal differences, the McClellanville/Santee split should be maintained until large samples can be examined. The McClellanville types, as applied here, refer to a paste with fine to medium sand aplastics (Trinkley 1981a).

[6]. The type designations, Deptford Cord Marked and Deptford Fabric Impressed, should replace the Cape Fear, Deep Creek, and Deptford/Deep Creek types now in use. Detailed ceramic analyses at Mattassee Lake (Anderson et al. 1982) and Minim Island (Espenshade and Brockington 1989) have demonstrated that these textile impressed types were produced on a paste technologically identical to the local Deptford series manifestations. Furthermore, the cord marked and fabric impressed decorative modes represent the incorporation of extralocal surface decorations into the established technological tradition. These additions were temporally and culturally significant; the placement of these types within the Deptford series reflects this significance.

[7]. The Hanover series is here separated from the Wilmington series, in contrast to their lumping at Mattassee Lake (Anderson et al. 1982). The Hanover series is demonstrably earlier than the Wilmington series (Blanton et al. 1986:13), and the splitting will facilitate a more complete understanding of cultural dynamics. It is unclear at this point if the two series can consistently be sorted; it appears that interior finish details (lumpy/cracked vs. well smoothed) can be utilized in distinguishing the two.

[8]. Recent radiocarbon dates (Blanton et al. 1986:12) indicate a tighter date range for Yadkin series pottery than originally posited by Anderson et al. (1982).

[9]. Deptford series ceramics appeared as the majority ware in contexts at Minim Island which were dated to circa 780 BC (Espenshade and Brockington 1989), in agreement with the chronologies offered by Trinkley (1989) and Anderson et al. (1982).

[10]. The inclusion of Refuge ware in the Thom's Creek II phase is supported by the radiocarbon assays from the testing (Drucker and Jackson 1984) and data recovery (Espenshade and Brockington 1989) excavations at the Minim Island Site. Refuge and Thom's Creek wares were shown to have co-occurred at Minim Island from circa 1440 BC through 1100 BC.

[11]. The Late Archaic/Early Woodland division has been widely debated. Trinkley (1989, 1990) recently suggested that the Woodland Period began with the first production of fiber tempered pottery, while Anderson et al. (1982) that both Thom's Creek and Stallings manifestations are Late Archaic. The recent data on (late) Thom's Creek and Refuge contemporaneity at Minim Island suggest that the presence of Thom's Creek ware does not indicate a Late Archaic affiliation. The problem is that Thom's creek pottery span a period in which there were major changes in the environment and cultural adaptations. For the current chronology, it is argued that the Late Archaic label should be applied to the period in which fiber tempered pottery was produced and in which shell rings were occupied (i.e., the Stallings and Thom's Creek I phases), 2,500 to 1,500 BC. A true Woodland adaptation apparently evolved in the subsequent Thom's Creek II phase, which is here considered the beginning of the Early Woodland Period.

Carolina and Georgia coasts (Griffin 1945; Hemmings 1970; Waring 1968), sites of the Ceramic Late Archaic also include the following: small shell middens apparently derived from a single household; shell-less sites of the interior coastal area; extremely ephemeral sites represented by a few diagnostic sherds; and major base camp/village sites of the Fall Line region (e.g., the Thom's Creek site, Griffin 1945).

The best known Ceramic Late Archaic sites are the shell rings which are relatively frequent along the tidal marsh between Charleston and Georgetown. This site type also occurs further to the south, along the Georgia and Florida coasts (Marrinan 1975; Trinkley 1990). These rings are usually round or oval rings of shell and other artifacts, with a relatively sterile area in the center. Many of these rings are currently in tidal marsh waters; they have been interpreted as actual habitation loci adjacent to or within productive shellfish beds (Trinkley 1985). These sites attest to a high degree of sedentism, at least on a seasonal basis.

Early Woodland Period (1500 - 200 BC)

The Early Woodland Period was a time when sea level climbed slowly and irregularly to within 1.0 m of current levels. The period effectively begins and ends with significant low stands within the general rising trend; the 1400 BC low stand was 4.0 m below present high marsh surface [bphms], and the 300 BC low stand was 2.9 m bphms (Brooks et al. 1989). The subsistence and settlement pattern of the Early Woodland Period suggests population expansion, and the movement of groups into areas which had been only minimally used in earlier periods. Early Woodland sites are very common on the South Carolina coast, and generally consist of shell middens near tidal marshes, and ceramic and lithic scatters in a variety of environmental zones. Non-shell sites have also been recognized (Trinkley 1982, 1990). It appears that group organization during this period was based on the semi-permanent occupation of shell midden sites, with the short-term use of interior Coastal Strand sites.

Ceramic typology allows the definition of two phases within the Early Woodland Period; the Thom's Creek II phase and the Deptford I phase. The Thom's Creek II phase (1500 - 800 BC) is recognized by the presence of a wide variety of Thom's Creek (untempered or fine-to-medium sand tempered) and Refuge (coarse sand temper) types. Evidence from testing (Drucker and Jackson 1984) and data recovery excavations (Espenshade and Brockington 1989) at Minim Island show that Thom's Creek and Refuge were separate, distinct, and contemporaneous wares from circa 1440 through 1100 BC.

The second phase of the Early Woodland Period is Deptford I (800 - 200 BC), recognized by the presence of Deptford (coarse to very coarse sand temper) and Hanover (grog tempered) ceramics. While Deptford Check Stamped and Deptford Simple Stamped were also produced in the subsequent Middle Woodland, the general lack of other Deptford types marks the Deptford I phase, i.e., only Deptford Simple Stamped and Deptford Check

Stamped are present in the Deptford series of Deptford I. In the region, Deptford is the dominant ware in Deptford I sites, and many sites are characterized by only Deptford Check Stamped and Plain pottery.

The Hanover Fabric Impressed and Hanover Cordmarked pottery are here discussed as a distinct series, rather than as a variety within the Wilmington (also grog tempered) series, as suggested by Anderson et al. (1982). The published radiocarbon dates (as summarized in Blanton et al. 1986) for Hanover wares range from 180 BC to 250 AD, with most clustering around 150 BC. In contrast, the earliest published radiocarbon date for Wilmington material is 400 AD, with dates of 600 to 1000 AD most common. Given this temporal discontinuity, it is argued here that Hanover and Wilmington are best treated as separate series. Although detailed type descriptions have not been provided for Hanover material (cf. South 1976), the mode of interior finishing may allow sorting of the two series. Hanover pottery characteristically has a lumpy interior, with cracks common as the general ceramic body separated from the large grog fragments. Wilmington vessels, in contrast, most commonly have well-smoothed interiors, lacking grog cracking. While these differences have not been verified through a detailed comparison of well dated Hanover and Wilmington materials, the separation (rather than combination) of the two series has the greater potential for providing meaningful temporal, spatial, and cultural insight.

Middle Woodland Period (200 BC - AD 500)

The extreme sea level fluctuations which marked the Ceramic Late Archaic and Early Woodland periods ceased during the Middle Woodland Period. The Middle Woodland Period began as sea level was rising from a significant low stand at 300 BC, and for the majority of the period the sea level remained within 1.0 m of current levels (Brooks et al. 1989). The comments of Brooks et al. (1989:95) are pertinent in describing the changes in settlement:

> It is apparent that a generally rising sea level, and corresponding estuarine expansion, caused an increased dispersion of some resources (e.g., small inter-tidal oyster beds in the expanding tidal creek network ...). This hypothesized change in the structure of the subsistence resource base may partially explain why these sites tend to be correspondingly smaller, more numerous, and more dispersed through time.

Survey and testing data from the a number of sites in the region clearly indicate that Middle Woodland Period sites are most frequently encountered throughout region. These sites include small, single house, shell middens (e.g. 38CH1047 [Espenshade 1989]); more significant shell middens (e.g., possibly Loci A and B at 38CH317 [Cable 1990]); and a wide variety of shell-less sites of varying size and density in the interior.

The present data from the region suggest seasonal mobility, with certain locations

revisited on a regular basis (e.g., 38GE46 [Espenshade and Brockington 1989]). Subsistence remains indicate that oysters and estuarine fish were major faunal contributors, while hickory nut and acorn have been recovered from ethnobotanical samples (Espenshade and Brockington 1989; Drucker and Jackson 1984; Trinkley 1976, 1980).

The Middle Woodland Period witnessed increased regional interaction, and saw the incorporation of extralocal ceramic decorative modes into the established Deptford technological tradition. As Caldwell (1958) first suggested, the period apparently saw the expansion and subsequent interaction of groups of different regional traditions (Espenshade 1986, 1990).

The Deptford II phase (200 BC - AD 200) saw the continued production of Deptford Check Stamped, Deptford Simple Stamped, Hanover Fabric Impressed, and Hanover Cordmarked pottery. In addition, pottery of the Yadkin (coarse to granular crushed quartz temper) series appears during this phase. The Hanover and Yadkin material are only minimally represented on sites of this phase, with Deptford wares continuing to be dominant.

In the Deptford III phase (AD 200 - 500), the cord marked and fabric impressed decorative modes of the Northern and Middle Eastern traditions begin to be produced on the established Deptford technological tradition. While these manifestations (i.e., fabric impressed or cord marked pottery with a coarse to very coarse sand paste) have been formerly termed Cape Fear (Anderson et al. 1982), Deep Creek (Trinkley 1989, 1990), or Deptford/Deep Creek, they are designated as Deptford types here to reflect the shared technological tradition. In other words, Deptford Cordmarked and Deptford Fabric Impressed were being made at the same time and in a technologically identical manner to Deptford Check Stamped and Deptford Simple Stamped pottery. These extralocal surface decorations were being produced on a local paste tradition, and the use of extralocal series names such as Deep Creek or Cape Fear is confusing and misleading.

Late in the Deptford III phase, Wilmington ware makes its first appearance. Cord marked, fabric impressed, and check stamped (very rare) types are present on the grog tempered paste.

Late Woodland Period (AD 500 - 900)

The nature of Late Woodland adaptation in the region is unclear due to a general lack of excavations of Late Woodland components, but Trinkley (1989:84) offers this summary:

> In many respects the South Carolina Late Woodland may be characterized as a continuation of previous Middle Woodland cultural assemblages. While outside the Carolinas there were major cultural changes, such as the

> continued development and elaboration of agriculture, the Carolina groups settled into a lifeway not appreciably different from that observed for the past 500 to 700 years.

The Late Woodland represents the most stable prehistoric period in terms of sea level change, with sea level for the entire period between 0.4 and 0.6 m bphms (Brooks et al. 1989). It would be expected that this general stability in climate and sea level would have resulted in a well entrenched settlement pattern, but the data are not available to address this expectation.

In fact, the recognition/interpretation of Late Woodland adaptations in the region has been somewhat hindered by past typological problems. The revised chronology uses two of the phases defined by Anderson et al. (1982): McClellanville (AD 500 to 700) and Santee I (AD 700 to 900). The Late Woodland overall is noteworthy for its lack of check stamped pottery. The McClellanville phase saw the continued production of Deptford Cordmarked, Deptford Fabric Impressed, and Wilmington Fabric Impressed pottery. Another pottery manifestation which first appears in this phase is the McClellanville series. Defined by Trinkley (1981a) from samples from the Walnut Grove Site (38CH260), McClellanville types are characterized by a paste with fine to medium sand aplastics. The McClellanville Fabric Impressed and McClellanville Cordmarked types may be technologically related to the later Santee series (Anderson et al. 1982), but this relationship has not been clearly defined. At present, it is reasonable to utilize two series until adequate samples of both series can be studied in detail.

The Santee I phase (AD 700 to 900) is characterized by the same pottery produced in the preceding phase, with the notable addition of Santee Simple Stamped pottery. The Santee Simple Stamped type (fine to medium sand aplastics) is overwhelmingly dominant on sites of this phase, with the other types only minimally represented.

Early Mississippian Period (AD 900 - 1200)

In much of the Southeast, the Mississippian Period was a time of major mound ceremonialism, regional redistribution of goods, chiefdoms, and maize horticulture as a major subsistence activity. It is unclear how early and to what extent similar developments occurred in the region. The ethnohistoric record, discussed in greater detail below, certainly indicates that seasonal villages and maize horticulture were present in the area, and that significant mound centers were present in the interior Coastal Plain to the north and west (Ferguson 1971, 1975; Anderson 1989; DePratter 1989). Anderson (1989:115) noted:

> One thing is emerging from recent work, and that is that characteristically Mississippian complicated stamped ceramics do not appear until at least A.D. 1100, and probably not until as late as A.D. 1200, over much of the South Carolina area. Whether this means that the Mississippian adaptation itself,

specifically the adoption of intensive agriculture within the context of hierarchical ranked society, occurred earlier remains unknown.

Three Mississippian phases, corresponding to Early, Middle, and Late Mississippian periods, have been recognized for the region (Anderson et al. 1982; Anderson 1989). Cable (1990) has suggested that refinement should be feasible within these broad phases, such as DePratter and Judge (1990) have attempted for the Wateree River basin. However, the current data base supports only these three phases: Santee II (AD 900 - 1200); Jeremy (AD 1200 - 1400); and Pee Dee (AD 1400 - 1550).

The Early Mississippian Santee II phase has been defined by the presence of Santee Simple Stamped, McClellanville Cordmarked, McClellanville Fabric Impressed, and Wilmington Cordmarked pottery (Anderson et al. 1982). However, Poplin et al. (1992) report complicated stamped wares similar to Savannah Complicated Stamped occurring during this phase. Radiocarbon dates from the Buck Hall Site (Poplin et al. 1992:278), ranging from AD 847 through AD 1020, place these ceramics within the previously defined Santee I and Santee II phases. Deptford Cordmarked and Deptford Fabric Impressed pottery were not produced in the Mississippian periods.

Sites of the Santee II phase in the region include large shell middens, such as 38CH260 (Trinkley 1981a); sites with apparent multiple, single house shell middens, such as 38CH146 and 38CH426 (Espenshade 1989); and multiple small shell middens, such as 38CH644 (Poplin et al. 1992). Adaptation during this period apparently saw a continuation of the generalized Woodland hunting-gathering-fishing economy, with perhaps a growing importance on horticulture and storable food stuffs. Anderson (1989) has suggested that environmental unpredictability premised the organization of hierarchical chiefdoms in the Southeast beginning in the Early Mississippian Period; the redistribution of stored goods (i.e., tribute) probably played an important role in the Mississippian social system. Maize was recovered from a feature suggested to date to the Early Mississippian Period from 38BK226, near St. Stephen (Anderson et al. 1982:346).

Middle Mississippian Period (AD 1200 - 1400)

The material culture of this phase includes the following ceramic types: Savannah Complicated Stamped, Savannah Check Stamped, Savannah Fine Cordmarked, and Santee Simple Stamped. The Santee Simple Stamped was a minority ware in this phase, and the assemblage was very similar to classic "Mouth of the Savannah River" Middle Mississippian (DePratter 1979).

Middle Mississippian Jeremy phase sites in the region include isolated single house shell middens (e.g., 38CH1048 [Espenshade 1989]), multiple shell midden sites (e.g., 38CH260 [Trinkley 1981a], 38CH300 [Trinkley 1981b], 38CH1116, and Moore's Landing in the Cape Romain Wildlife Refuge [Anderson and Claggett 1979a, 1979b]), shell-less ceramic

scatters on the interior swamps (e.g., 38CH1189 and 38BK1176).

Late Mississippian Period (AD 1400 - 1550)

During this phase, the regional chiefdoms apparently realigned, shifting away from the Savannah River centers to those located in the Oconee River basin and the Wateree-Congaree basin. As in the earlier Mississippian phases, the Berkeley/Charleston County area apparently lacked any mound centers, although the dating and interpretation of the small mounds at 38CH644 remain enigmatic. Regardless, it appears that the region was well removed from the core of Cofitachequi, the chiefdom to the interior (DePratter 1989; Anderson 1989). DePratter (1989:150) specifies:

> The absence of sixteenth century mound sites in the upper Santee River valley would seem to indicate that there were no large population centers there. Any attempt to extend the limits of Cofitachequi even farther south and southeast to the coast is pure speculation that goes counter to the sparse evidence available.

Pee Dee Complicated Stamped and Mississippian Plain ceramics mark the Pee Dee phase. Simple stamped, cord marked, and check stamped pottery was apparently not produced in this period.

Pee Dee phase components have been identified at the Moore's Landing shell midden (Anderson and Claggett 1979a, 1979b), at the 38CH260 shell midden (Trinkley 1981a), at the 38CH300 shell midden (Trinkley 1981b), and at 38CH769, an interior ceramic scatter on the Wambaw Swamp, to the east.

HISTORIC OCCUPATION OF THE REGION

The Charleston Harbor region has a rich history following the arrival of Europeans in the area; yet no comprehensive overview has been produced to date. The following overview draws from the works of Orvin (1973), Smith (1931), Gregorie (1961), and Rogers (1984), among others. The earliest historic accounts also provide some idea of the lifeways of Native American groups who were present during the sixteenth and seventeenth centuries.

The ethnohistoric record from coastal South Carolina suggests that the protohistoric groups of the region followed a seasonal pattern which included summer aggregation in villages for planting and harvesting domesticates, and dispersal into one to three family settlements for the remainder of the year (Rogel 1570 [in Waddell 1980:147-151]). This coastal protohistoric adaptation is apparently very similar to the Guale pattern of the Georgia coast, as reconstructed by Crook (1986:18). Specific accounts of the protohistoric

groups of the region, the Sewee and the Santee, have been summarized by Waddell (1980). It appears that both groups included horticultural production within their seasonal round, but did not have permanent, year round villages. Trinkley (1981c) suggests that a late variety of Pee Dee ceramics was produced by Sewee groups in the region; his late variety may correspond to the Ashley ware initially described by South (1973; see also Anderson et al. 1982).

The Ashley phase is recognized by the presence of Ashley Complicated Stamped and Mississippian Plain pottery (Anderson et al. 1982). Ashley phase components have been identified or suggested at the Moore's Landing shell midden (Anderson and Claggett 1979a, 1979b), and possibly at 38CH536, a shell midden site on Awendaw Creek. Although Lawson (1709 [1967]) reported a mound and village site about 20 miles north of the Santee river, it appears that isolated homesteads, hamlets, and small seasonal villages were more typical of the Sewee Indian sites in the lower Cooper drainage and nearby portions of the Low Country (Anderson and Logan 1981:31).

Initial European exploration into coastal South Carolina occurred during the early sixteenth century. Indian groups encountered by the European explorers and settlers probably were living in a manner quite similar to the late prehistoric Mississippian groups identified in archaeological sites throughout the Southeast. Indeed, the highly structured Indian society of Cofitachequi, formerly located in central South Carolina and visited by De Soto in 1540, represents an excellent example of the Mississippian social organizations present throughout southeastern North America during the late prehistoric period (Anderson 1985). However, the initial European forays into the Southeast contributed to the disintegration and collapse of the aboriginal Mississippian social structures; disease, warfare, and European slave raids all contributed to the rapid decline of the regional Indian populations during the sixteenth century (Dobyns 1983; Ramenofsky 1982; Smith 1984). By the late seventeenth century, Indian groups in coastal South Carolina apparently lived in small politically and socially autonomous semi-sedentary groups (Waddell 1980). By the middle to late eighteenth century, very few Indians remained in the region; all had been displaced or annihilated by the ever-expanding English colonial settlement of the Carolinas (Bull 1770 cited in Anderson and Logan 1981:24-25).

Waddell (1980) identified 19 distinct groups between the mouth of the Santee River and the mouth of the Savannah River in the middle of the sixteenth century. Anderson and Logan (1981:29) suggest that many of these groups probably were controlled by Cofitachequi, the dominant Mississippian center/polity in South Carolina, prior to its collapse. By the seventeenth century, all were independently organized. In the immediate vicinity of St. Thomas Parish, these groups included the Etiwan and Seewee "tribes." The Etiwans were mainly settled on or near Daniel Island, but their range extended from the to the head of the Cooper River. The territory of the Seewee met the territory of the Etiwan high up the Cooper, and extended to the north as far as the Santee River (Orvin 1973:14). Mortier's map of Carolina (Figure 2), prepared in 1696, shows the Sampa Indians between the Cooper and Wando Rivers, to the northeast of Daniel Island, and the Wando

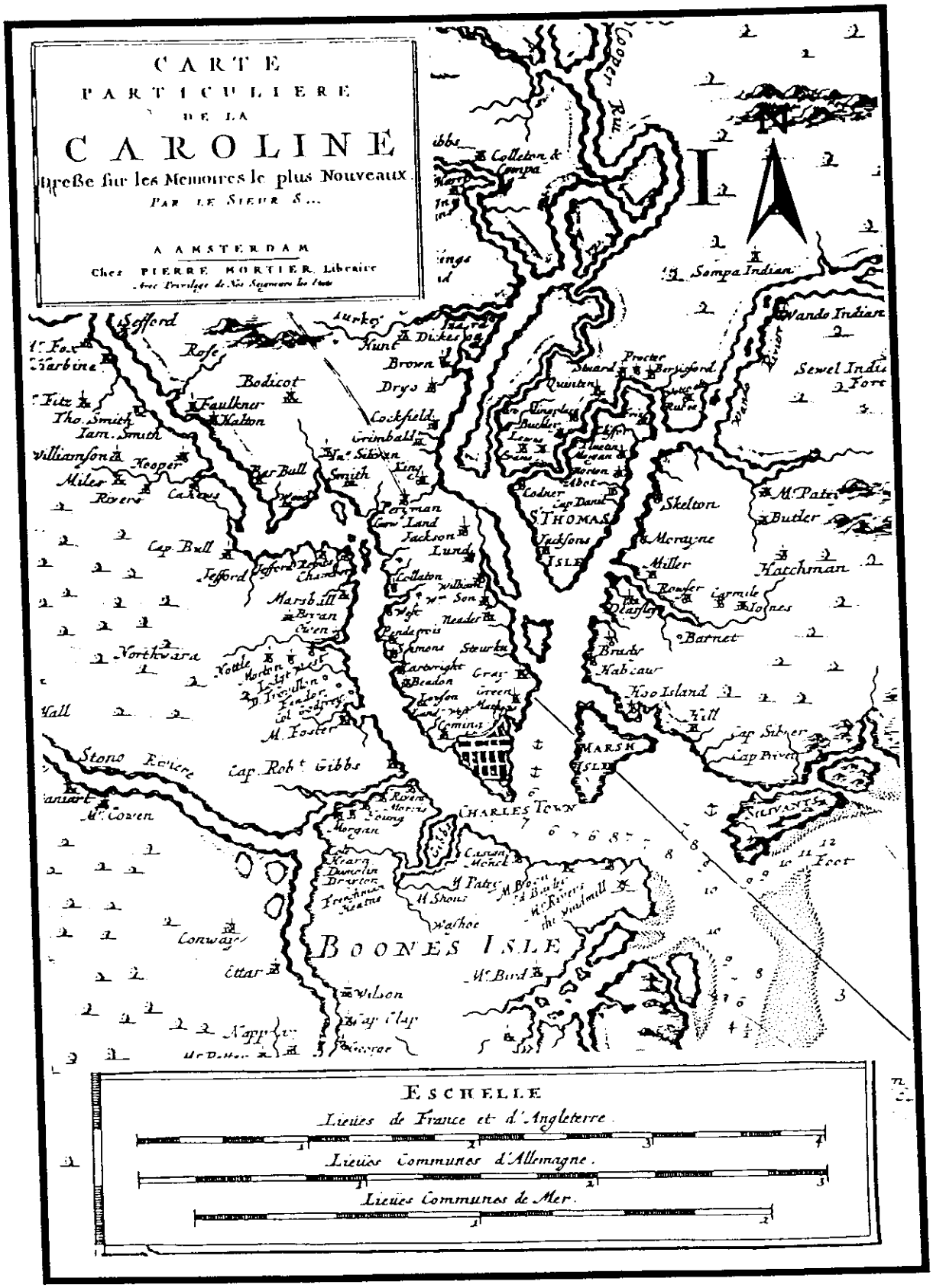

Figure 2. The Charleston Harbor Region in 1696.

Indians and Sewel [sic] Indian Fort east of the Wando River, northeast of Daniel Island. Presumably, any of these groups could have traveled through the project tract, although much of the Island was settled at that time.

The Carolina coast was first permanently settled by Europeans in 1670. The early Spanish attempt at San Miguel de Gualdape (1526) to the north, the French attempt at Port Royal (1562), and the Spanish settlement at Santa Elena (1566-1587) on Parris Island apparently had little impact on the study area. The establishment of Charles Towne by the British in 1670, however, sparked a period of intensive fur trade with the Indians of the region, and provided a base from which settlers quickly spread up the Wando and Cooper Rivers.

The early economic development of the region focused on the Indian trade. In Henry Woodward's accounts, it is mentioned that Maurice Mathews opened up a trade from Fair Lawn, near Moncks Corner, by July of 1678 (Fagg 1970). However, agricultural industries soon replaced the furs and other local commodities acquired from the aboriginal inhabitants of the region. Trade with the Indians was pursued aggressively through the beginning of the eighteenth century, but by 1716, conflicts with the Europeans and disease had drastically reduced or displaced the local native population. Trade with the interior Catawba and Cherokee would continue throughout the eighteenth century.

The Carolinas were originally settled as a private colony under the proprietary system; not until 1719 did South Carolina become a royal colony controlled by the British crown. Grants of land were given to the Lords Proprietors of Carolina as well as to those interested in settling in the colony. The Church Act of 1706 established the parish as the local unit of government. Counties or districts within Carolina were divided into parishes, with the local church serving as the administrative center.

The initial settlements in the region took advantage of the extensive woodlands of the region, harvesting the timber cleared from the land for the production of naval stores. Lumber, tar, turpentine, and resin all were produced from the forests cleared for agricultural lands (Gregorie 1961:20; Orvin 1973). Evidences of these harvesting activities include many small circular tar kilns, found throughout the region (Hart 1986). The lumber industry has continued to be very important in the economy of the region.

By the mid-1700s, rice cultivation, cattle raising, and the preparation of naval stores were the leading industries along the rivers that empty into Charleston Harbor (Orvin 1973:58). Rice was the most profitable and leading commodity of the region, although indigo also was intensively cultivated between 1740 and 1776 (Pinckney 1976); later, after a collapse of the rice marked, cotton was experimented with as replacement for rice agriculture. Both crops were grown on many plantations, with the low lying areas along the tidally influenced rivers and the many streams and swamps of the region used as rice fields and the higher and drier upland areas plowed and planted in cotton.

During this period, the population of South Carolina expanded drastically. More and more areas were settled, with plantations spreading throughout much of the Low Country. The spread of plantations up the Ashley River is amply illustrated in Mouzon's (1775) map of the Carolinas (Figure 3). The importance of Charleston as a port for the export of local products and the importation of other goods and commodities continued to grow throughout the eighteenth and nineteenth centuries. By the 1840s, the thriving port had been connected with the Savannah River by railroad, providing additional avenues of export for much of the interior of South Carolina and Georgia. The roads and railroads that formed the base of this interior network are amply displayed in Colton's 1854 map of South Carolina (Figure 4.

Large scale agricultural production was achieved through the operation of plantations that employed slave labor. Slaves were brought from western Africa to perform the many tasks necessary to produce cash crops on the plantations. Slave labor was especially essential for rice production, with knowledgeable slaves (i.e., those taken from African rice-producing societies) conducting and directing most of the activities associated with rice growing and harvesting (Joyner 1984). This system of production would continue until the end of the Civil War (1861-1865), which resulted in the abolition of slavery throughout the United States.

Many of the early settlements and plantations focused on the Cooper and Wando Rivers. These streams provided the best opportunity for profitable agricultural production (i.e., rice cultivation) as well as the best avenues of transportation to Charleston or other settlements in the region (South and Hartley 1985). Evidence of the many plantations along these rivers remains today primarily as archaeological sites, although some, like Rice Hope Plantation near Moncks Corner, are still occupied. However, interior tracts also were opened as timber harvesting cleared more lands.

Agricultural products remained the primary industry of the county throughout the nineteenth century. Following the Civil War, the mode of production shifted from plantations with slave labor to one of tenant farmed or share cropped plots within the larger landholdings. This resulted in the dispersal of farm laborers across the upland agricultural portions of the region since cotton could be farmed in small plots. Most of the rice lands were abandoned, however, since adequate pools of labor and capital were not available to continue the cultivation of this crop. The trend of population dispersal continued into the twentieth century, as evidenced by the density of residences through rural portions of the Harbor region in the 1930s (Figure 5). However, more recently, large scale production of soybeans, in particular, has evidenced a shift from small farms to individuals planting and harvesting larger and larger areas. Other modern crops in the region include tobacco, which has replaced the earlier cash crops of the region (e.g., indigo, rice, and cotton) (Long 1980).

As noted above, other industries also developed in the region at an early date. Naval stores production (timber, pitch, tar, and later turpentine) was an early industrial focus of the Coastal Plain. This industry continued throughout the eighteenth and nineteenth

Figure 3. The Charleston Harbor Region in the 1770s.

Figure 4. The Charleston Harbor Region in the 1850s.

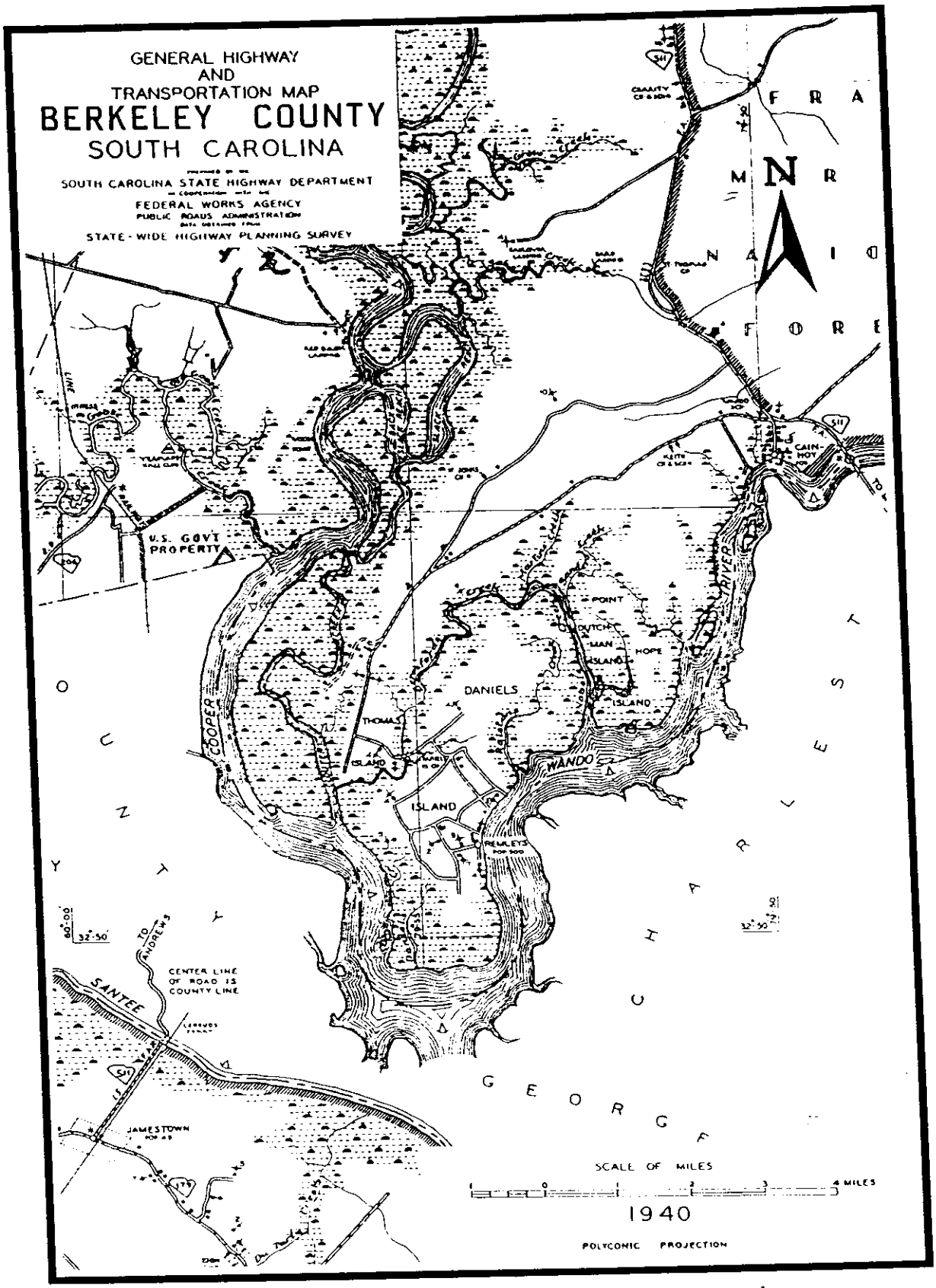

Figure 5. Daniel Island in the 1930s, showing the many tenant houses (from the SCDHPT Berkeley County 1940 road map).

centuries. With nearly 83 per cent of the county covered in forest, the timber industry remains a primary source of income for the region (Long 1980:1). Given the growth of the Berkeley and Charleston Counties since World War II, and their expected continued growth in the near future, such industrial uses as well as residential development of long abandoned lands adjacent to the Charleston municipal area can be expected. More recently, upland areas within the county have been mined for various aggregates and fills. These fills are employed in road building, and residential and industrial developments.

CHAPTER III

RESEARCH METHODS

Assessment of the nineteen potential dredge spoil disposal sites involved primarily a review of previously conducted cultural resources investigations and the files of known sites and historic properties to determine the nature and location of cultural resources in the region. Limited field investigations of the upland locales that contain a disposal site was conducted to assist in the assessment of areas suspected to possess a high probability of containing cultural resources. The distributions of known and potential resources in or near each possible disposal site then was assessed to determine the effect that the construction and operation of the facility could have on these resources. These effects were assessed with respect to the proximity of the possible disposal site to particular resources or areas likely to contain resources and the kinds of activities expected to occur during the construction and operation of the facility. Each possible disposal site then was assigned a score based on its potential to affect adversely known or potential cultural resources. Further descriptions of the methods employed during each phase of the project are described below.

BACKGROUND RESEARCH

The first phase of this reconnaissance involved the examination of existing inventories of cultural resources in the Charleston Harbor region. These inventories included the archaeological site files maintained by the South Carolina Institute of Archaeology and Anthropology at the University of South Carolina in Columbia and the National Register of Historic Places listing maintained by South Carolina Archives and History in Columbia. All recorded sites or listed NRHP properties on the five USGS 7.5 minute topographic maps (Cainhoy, Charleston, Fort Moultrie, James Island, and North Charleston quadrangles) containing the nineteen possible dredge spoil disposal site were noted.

Additional information concerning the distribution of terrestrial archaeological resources was collected from reports of surveys conducted in the region to provide compliance with existing State and Federal regulations and guidelines concerning the management of cultural resources in the region. This review was limited primarily to the area immediately adjacent to Charleston Harbor (i.e., within five miles of the possible dredge disposal sites). Examples include:

Brooks and Scurry's (1979) survey of the Amoco Chemical Plant (Berkeley County).

Scurry and Brook's (1980) survey of the SC State Ports Authority Wando

River Terminal (Charleston County).

Trinkley and Tippett's (1980) survey of the Mark Clark Expressway (I-526) corridor (Charleston and Berkeley Counties).

Martin et al.'s (1987) survey of the Molasses Creek tract (Charleston County).

Southerlin et al.'s (1988) survey of the Parker Island tract (Charleston County).

Espenshade and Grunden's (1989) survey of the Brickyard tract (Charleston County).

Poplin's (1991a, 1991b) cultural resources overviews of the Jack Primus and Harper tracts (Berkeley County).

Southerlin and Espenshade's (1991) survey of the Belle Hall tract (Charleston County).

Jones and Poplin's (1992) survey of two borrow pit locales on the Jack Primus tract (Berkeley County).

Roberts and Poplin's (1992) cultural resources overview of Daniel Island (Berkeley Island).

Information concerning potential underwater cultural resources was gathered through interviews with the staff of the South Carolina Institute of Archaeology and Anthropology's (SCIAA) Underwater Division.

The locations of known sites in the project region (as defined by the five USGS 7.5 minute quadrangles containing the nineteen possible disposal sites) were plotted. The locations of these known resources were compared visually to the locations of possible disposal sites to determine whether similar topographic settings existed between where sites have been identified in the region and within the possible disposal sites. The bias of the focus of previous surveys in the region on tracts of land adjacent to waterways, as opposed to more interior or inter-riverine settings, was not accounted for in this assessment. It should be noted, however, that with one exception, all of the possible disposal sites are adjacent to or within waterways or marshes. Thus, the distribution of known resources in these locales are the most appropriate settings for comparisons to the settings of the possible disposal sites.

Interpretations of terrestrial archaeological site distributions in the Charleston Harbor region suggest that most sites are located adjacent to tidal waterways or marshes (within 300 m) and on relatively well drained soils. Table 4 provides a summary of the sites

Table 4. Site Distributions by Soil Types from Selected Surveys near Charleston Harbor.

ANHYDRIC SOILS

		Berkeley County				Charleston County						TOTAL
	Texture	T&T	B&S	DI	I-526	S&B	MCk	E&G	PI	BH	MtP	SITES
Bonneau	ls		5	2								7
Cainhoy	fs	4	1		10							15
Caroline	fsl		4									4
Charleston	lfs	8					3	1		5	1	18
Chipley-Echa	lfs											0
Duplin	fsl	3	2									5
Goldsboro	ls		1		1							2
Hockley	lfs	10							6			16
Lakeland	s											0
Norfolk	ls		3	1							1	5
Wagram	lfs	5					4				1	10
Wando	lfs					26	6				6	38
Total Sites		30	16	3	11	26	13	1	6	5	9	120

HYDRIC SOILS

Capers	scl										1	1
Dawhoo	lfs						2					2
Dunbar	fsl	1	2									3
Kiawah	lfs										1	1
Meggett	l		4		1							5
Seabrook	lfs	5									2	7
Stono	fsl										1	1
Tawcaw	cl		3									3
Wadmalaw	fsl									2		2
Wahee	l				1							1
Yonges	lfs	2							5	10	1	18
Total Sites		8	9	1	1	0	2	5	12	1	5	44

Textures: c= clay, f= fine, l= loam, s= sand

T&T= Trinkley and Tippett 1980
B&S= Brooks and Scurry 1979
DI= Daniel Island (other sites)
I-526= Other sites - Cainhoy Peninsula

S&B= Scurry and Brooks 1980
MCk= Martin et al. 1987
E&G= Espenshade and Grunden 1989
PI= Southerlin et al. 1988
BH= Southerlin and Espenshade 1991
MtP= Other sites - Mt Pleasant

identified during the above referenced surveys and the numbers of sites associated with each soil types; soil types also are sorted by anhydric (dry or well drained) and hydric (wet or poorly drained) characteristics (as extracted from Long 1980 and Miller 1971). Examination of this table demonstrates that approximately 75 per cent (120 of 164 total sites) of all sites identified to date in the Mount Pleasant area, Daniel Island and Cainhoy Peninsula, and further north on the Cooper River are located on well drained (anhydric soils). Comparison to soil types within the proposed disposal sites and within 300 m of tidal waters and marshes could then suggest the potential for unknown resources to be present.

FIELD INVESTIGATIONS

Limited field inspections of five of the seven possible dredge spoil disposal sites that contained primarily uplands were conducted. These potential upland sites included:

Site D (Upper Thomas Island).

Site F (Lower Thomas Island).

Site N (Morris Island).

Site Q (Cainhoy Road).

Site R (Point Hope Island).

The upland sites not inspected included Rodent Island and Parkers Island. Access to the former locale was difficult by land; efforts to access the tract by boat proved futile due to the extent of marshes around the low uplands within the tract. The Parker Island site had been surveyed intensively by Southerlin et al. (1988); re-examination of this tract was not considered necessary.

Once access to a possible disposal site was gained, a pedestrian traverse of the margins of the site, or segments of the margins, was undertaken. In Site D, the northeast corner of the tract was inspected. In Site F, areas along Beresford and Clouter Creek marshes were inspected. In Site N, two interior areas of Crevasse-Dawhoo soils (consisting primarily of active dune fields) was inspected. In Site Q, logging roads through the possible disposal site were traversed. In Site R, areas adjacent to Sanders Creek, the Wando River, and an interior wetland were inspected. The locations of these inspections are discussed further below. Surface exposures and the marsh edge were examined along this traverse. In addition, small (30 cm by 30 cm) shovel tests were excavated at 30 m intervals along each traverse; fill from these tests was screened through 6.35 mm hardware cloth. No cultural remains were encountered along any of these traverses.

ASSESSMENTS OF POTENTIAL EFFECTS

Once the potential for each site to contain known or unknown cultural resources was determined, assessments of the effect of the construction and operation of a dredge disposal facility at that locale could be undertaken. This involved the identification of the kinds of effects expected to occur as a result of the construction and operation of dredge site. For the most part, these effects were limited to direct impacts; however, the potential of a possible disposal site to affect visually listed NRHP properties in historic Charleston Harbor was considered. Thus, the potential of each possible disposal site was assessed with respect to known NRHP properties, known NRHP eligible properties (archaeological sites), and potential unknown cultural resources (as derived from the soils and topographic data noted above).

A simple scale for potential effects was defined for each category of resource identified (i.e., NRHP property, NRHP eligible property, and unknown resources). Four values were set. These included:

0 No apparent adverse effect.

1 Minimal apparent adverse effects.

3 Moderate apparent adverse effects.

5 Extreme apparent adverse effects.

The sum of the scores assigned each possible dredge spoil disposal site represented the anticipated effect the construction and operation of a locale could be expected to produce on cultural resources.

The possible disposal sites then were ranked from low scores to high (implying little or no adverse effects anticipated to extensive adverse effects anticipated). Ranks were assigned from *1* to *19*, with tied rankings permitted. In this manner, those locales that appeared least likely to affect cultural resources could be delimited, and informed selections of the most appropriate locales for intensive examination accomplished.

CHAPTER IV

RESULTS OF THE INVESTIGATIONS

Data gathered from archival and field sources were employed to assess the potential of the construction and operation of nineteen possible dredge spoil disposal sites to affect cultural resources. Initially, all known NRHP properties and archaeological sites in each possible disposal site were identified; only Site H (Parker Island) contained any known resources, although Site L (Middle Shoal) is immediately adjacent to Castle Pinckney (38CH76), an NRHP listed property. Then, all cultural resources within one mile of each possible disposal site was identified. Several of the disposal sites presently have no cultural resources within one mile. Therefore, all resources within two miles of each disposal site were identified. Several of the sites still were adjacent to few resources within this more extensive radius. When one considers that the distributions of known sites corresponds more to where archaeological surveys have been conducted rather than where sites actually are (or were) located, efforts to identify the potential for areas within each site were undertaken. Figures 6, 7, 8, 9, and 10 display known resources in or near Sites A through N, and Sites Q through S.

Possible Disposal Site A contains no known NRHP properties or archaeological sites; three known archaeological sites (38BK1269, 38BK1270, and 38BK1271) lie within two miles of the site on the opposite bank of the Cooper River (Figure 6). Site B contains no known resources; three known archaeological sites (38BK831, 38BK832, and 38BK844) lie within two miles of this site, on the Cainhoy Peninsula across the Cooper River from Site B (Figure 6). Site C contains no known cultural resources and no known resources are located within two miles of this possible disposal site (Figure 6).

Possible Disposal Site D contains no known resources. However, approximately 20 known archaeological sites lie within one mile of Site D to the southwest and an additional six sites lie within two miles (Figure 7). Site E also contains no known sites; approximately 20 known archaeological sites are located within one mile, and an additional five sites are located within two miles of Site E (Figure 7).

Site F contains no known resources. However, this site contains the terminus of Cainhoy Road. Undoubtedly, this road follows an historic road from Dover-Calais ferry over the Cooper River northward towards Moncks Corner. Facilities associated with the ferry (landing?, an inn?, etc.) may be present in or near Site F. Additionally, five known archaeological sites are located within one mile of the site, and approximately 30 sites are located within two miles of Site F (Figure 7).

Site G contains no known cultural resources. Five known archaeological sites on Daniel Island are located within one mile of this possible disposal site. The remaining

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Figure 7. Known cultural resources near Sites D, E, and F.

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Figure 8. Known cultural resources near Sites G, H, Q, and R.

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Figure 9. Known cultural resources near Sites I, J, K, L, and S.

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Figure 10. Known cultural resources near Sites M and N.

known archaeological sites on Daniel Island, as well as all archaeological sites identified on the I-526 right-of-way on opposite bank of the Wando River, lie within two miles of Site G (Figure 8).

Site H contains 19 known archaeological sites; 14 of these sites have been recommended as eligible or potentially eligible for nomination to the NRHP; a large number of additional sites lie within one and two miles of Site H (Figure 8).

Site I contains no known cultural resources; however, this existing disposal area is adjacent to Magnolia Cemetery, an NRHP listed property (Figure 9) and one archaeological site (38CH1452) lies within one mile. Site J also contains no known cultural resources and no known resources are present within one mile of Site J (Figure 9). Both Sites I and J are within two miles of the downtown Charleston historic district and numerous archaeological sites within this portion of the city (Figure 9).

Site K contains no known cultural resources; at least 12 known archaeological sites are located within one mile Site K (Figure 9), and 20+ sites are located within two miles, including portions of the Mount Pleasant historic district. Site K is also adjacent to and visible from the historic properties moored at Patriots' Point. Site L contains no known cultural resources; however, it is adjacent to Castle Pinckney (38CH76), a NRHP property. The Charleston and Mount Pleasant historic districts are visible from Site L as well.

Site M contains no known cultural resources; seven known archaeological sites lie within one mile (Figure 10). This site is visible from Fort Sumter (38CH75) a NRHP property as well as from Castle Pinckney and Mount Pleasant historic districts.

Site N contains no known cultural resources. Two reported shipwrecks (Civil War monitors USS Keokuk [38CH271] and USS Weehauken [38CH272]) are located near the present low tide line on Morris Island. While precise locations are not available at present, these NRHP eligible resources may be within or adjacent to Site N. Other archaeological sites within one mile of Site N include 38CH992 (the remains of the "Swamp Angel"- a Federal gun that shelled Charleston and its defense during the Civil War) and 38CH1213, the remains of Federal batteries and camps on the north end of Folly Island. Additionally, the Morris Island Light, a NRHP listed property, is visible from Site N (Figure 10).

Sites O and P, lying several miles offshore (see Figure 1), contain no known cultural resources. Undoubtedly, wrecked vessels are present in or near these locales.

Site Q contains no known cultural resources, and no known resources exist within one mile of the site (Figure 8). The Nelliefield Cemetery and 38BK1349 lie within two miles Site Q on the west bank of the Wando River. A large number of sites lie within two miles Site Q on the east bank of the Wando as well. Similarly, Site R contains no known resources and no resources are located within one mile of this site (Figure 8). Again, numerous sites are present on the opposite (east) bank of the Wando River.

Site S contains no known cultural resources. No known resources lie within one mile of Site S; however, large numbers of sites lie within two miles of Site S both on the east and west banks of the Cooper River (Figure 9).

ESTIMATING RESOURCE POTENTIAL

The distributions of sites identified during a selected number of intensive archaeological surveys conducted in the Mount Pleasant and Daniel Island areas were employed to create a simple model of site distributions in the Charleston Harbor area. Simple inspection of the locations of these recorded sites on USGS topographic maps demonstrates that most sites are located within 300 m of tidally affected waterways or marshes. Prehistoric associations with tidal marshes and streams undoubtedly relate to access to marine resources (e.g., shellfish, crustaceans, and fishes). Historic associations with these settings appears to relate to "site" access and the use of waterways a transportation routes (after South and Hartley 1985). Undoubtedly, access to food resources also may have been a factor in the selection of historic locales.

In addition, several of these studies have suggested that soil qualities, principally drainage and permeability, have an affect on the selection of locales for occupation by past occupants of the region. The earliest efforts to demonstrate this relationship were undertaken by Brooks and Scurry (1979) during their survey of AMOCO Chemical Plant location on the Cooper River in Berkeley County, approximately two miles upriver from the northern disposal sites considered during this project. Sixty per cent (16 of 25) of all sites in the AMOCO tract were located on dry, well drained [anhydric] soils (see Table 4). Southerlin and Espenshade (1991) noted a similar association in the Belle Hall Development Tract, on the Wando River in Mount Pleasant, with five of six sites located on anhydric soils (see Table 4).

Comparisons to other surveys in the region demonstrated a similar association with two exceptions (see Table 4). Southerlin et al.'s (1988) survey of Parker Island and Espenshade and Grunden's (1989) survey of the Brickyard Development Tract identified more sites on hydric soils than on drier soil types. It should be noted the two tracts in question contain predominantly hydric soils, and both contain extensive brickworks and associated sites. The poor drainage conditions apparently limited the agricultural use of these lands and prompted their owners to initiate industrial pursuits. The qualities generally considered to limit use of these lands (wet soils probably with high clay contents) would have been ideal for brick making. Undoubtedly, efficiency in manufacture required that ancillary settlements and facilities be located near the brickworks, resulting the location of residential sites in these more marginal areas as well. It should be noted that prehistoric sites were present in these tracts as well. Different parameters must have guided the selection of these wetter areas for occupation during the prehistoric past. Possibly, these areas were drier during the period of prehistoric occupation, or specific activities are represented by these prehistoric deposits that required wet conditions.

The differences in criteria for site selection between prehistoric and historic occupants should be considered in the construction of any definitive model of site location. During the current study, this dichotomy was not undertaken. Basically, the kinds of sites expected to exist within or near a possible disposal site was not considered as critical as the potential for any kind of resource to be present. Plus, as demonstrated in Table 4 with two exceptions, most prehistoric and historic sites conform to the same locational parameters. Thus, development of two separate models of site location (or more) for prehistoric and historic sites, while informative to the understanding of past land use was not critical to the interpretation of possible effects generated by the construction and operation of possible disposal sites at this stage of the selection process.

Using these two environmental variables (distance to tidal water and soil type), the potential of each possible disposal site to contain cultural resources was determined. All of the disposal sites, with the exception of Site Q (Cainhoy Road) and the offshore/underwater sites (L, O, P, and S), lie within 300 m of tidally affected streams or marshes. Thus, cultural resources could be expected to be present in all of thee possible disposal sites not underwater.

Soil types within each disposal site (excepting the underwater locales) then were determined to provide additional assessment of the potential of each site to contain cultural resources. Soils within each possible disposal site were separated into anhydric and hydric types. This information is summarized in Table 5. General estimates of the area represented by these types also are included.

Examination of these data provide a basic assessment of the potential of each possible disposal site to contain cultural resources. Initially, the possible underwater disposal sites (Sites L, O, P, and S) are eliminated from these discussions; they will be discussed further below. Those locales that contain existing disposal sites and extremely limited amounts of tidally inundated soils appear to possess little or no potential to contain any unidentified cultural resources; these include Sites A, B, C, E, I, J, and M. While these sites once contained pristine marsh or uplands (i.e., were not buried in dredged materials), access to these original landscapes has been severely restricted (if not rendered impossible) by the presence of many feet of dredge spoil. Additionally, any resources beneath the spoil deposits have probably been altered due to the added pressure and moisture deposited on top of them. Combined with periodic excavations into the spoil deposits to assist in rehabilitation or stabilization of the spoils, most resources buried beneath dredged materials are likely to have been destroyed. Thus, these areas can be considered effectively devoid of cultural resources. Only the undisturbed marsh deposits bordering the existing dikes around present disposal sites would possess any potential for containing cultural resources.

Site N also contains similar deposits; however, Morris Island was the scene of intense military activities during the Civil War that has left various artifacts and possible intact deposits throughout the island. It should be noted that most of the former fortifications on the island have eroded away (see Figure 11). However, at least two known wrecks (the

Table 5. Soils present in the Possible Disposal Sites.

SITE	HYDRIC SOILS	ANHYDRIC SOILS	COMMENTS
A	Bohicket scl*	-	Mostly existing spoil deposits
B	-	-	Existing disposal site
C	Bohicket scl*, Meggett	Duplin	Less than 5% upland
D	Bohicket scl*, Capers*	Cainhoy	≈5% upland
E	-	-	Existing disposal site
F	Capers*, Lenoir fsl, Meggett, Wahee	Caroline, Craven l, Duplin, Norfolk	Mostly upland w/Meggett, Wahee, Lenoir most common
G	Bohicket scl*, Capers* Bethera l, Meggett, Rains fsl	Bonneau, Duplin, Norfolk	Mostly Meggett
H	Tidal Marsh Soft*, Capers* Wadmalaw, Yonges	Hockley, Orangeburg lfs	Mostly Yonges (40%), Anhydrics are 20% of tract
I	-	-	Unmapped but existing disposal area
J	-	-	Existing disposal site
K	-	-	Existing disposal site
L	-	-	Underwater
M	Tidal Marsh Soft*, Capers*	-	
N	Capers*, Coastal beaches*	Crevasse-Dawhoo s	Mostly underwater
O	-	-	Underwater offshore
P	-	-	Underwater offshore
Q	Lenoir fsl, Meggett, Wahee	Goldsboro	Mostly Meggett and Wahee
R	Bohicket scl*, Capers*, Meggett, Wahee	-	
S	-	-	Underwater

*Indicates tidally inundated soils or deposits
c= clay, f= fine, l= loam, s= sand

monitors USS Keokuk [38CH271] and Weehauken [38CH272]) lie in the intratidal zone on the foreshore of the island, and may be present within possible Disposal Site N. Limited inspection of dune fields and beaches on Morris Island (see Figure 10) failed to recover any cultural remains or identify areas that appeared likely to contain intact cultural deposits. These negative results should not be considered too highly however; more intensive efforts, including alternate techniques such as metal detecting, may be necessary to locate military artifacts or facilities in such environments.

The remaining six possible disposal sites are primarily upland locales. As stated above, Site H (Parker Island) has been intensively surveyed; this tract contains 18 archaeological sites (38CH306 and 38CH1023 through 38CH1039). Site D (Upper Thomas Island) lies primarily in tidal marshes. However, the site intrudes upon uplands that consist entirely of Cainhoy fine sands; numerous sites have been recorded on this soil type on the Cainhoy Peninsula (see Table 4). Thus, the approximately five per cent of this site that lies on the uplands has a very potential to contain cultural resources. Inspection of the northeast corner of Site D (see Figure 7) during the field investigations failed to recover any cultural remains. However, prehistoric Middle Woodland check stamped ceramics were observed on private lands between Cainhoy Road and the possible disposal site during an initial reconnaissance of Site D. Thus, the potential for remains within the site remains high.

Sites F, G, Q, and R also consist of primarily uplands, with tidal marshes included. However, the majority of these tracts are covered by hydric soils. Thus, these sites presumably possess a lower potential for containing cultural resources than the upland portions of Site D. Inspection of portions of Site F along the marshes of Clouter and Beresford Creeks (see Figure 7) failed to identify any cultural remains. While most of this area contains few hydric soils, the intensity of coverage was not adequate to eliminate the possibility of archaeological deposits being present in the site. Similarly, three portions of Site R adjacent to the Wando River, Sanders Creek, and an interior wetland (see Figure 8) were examined without recovering any cultural remains. Inspection of areas adjacent to the logging roads through Site Q (see Figure 8) again produced negative results. Again, the limited intensity of coverage in these sites combined with the presence of soils interpreted to possess a lower potential for containing cultural resources precludes any assumptions that no cultural resources are likely to be present in these upland sites. Rather, site densities (i.e., the numbers of sites per acre) in areas defined as possessing low probabilities for cultural remains generally are lower, thereby suggesting that more acres would have to be examined to find a site than in areas defined as possessing high probabilities for cultural remains.

It should be noted that most tidal marshes have been assumed to possess little or no potential to contain cultural resources. Few sites have been identified in the tidally affected portions of the Charleston Harbor region. However, few surveys have included these environments since most development activities (the usual "trigger" for undertaking cultural resource surveys) are restricted from affecting marshes and waterways. However, sites have

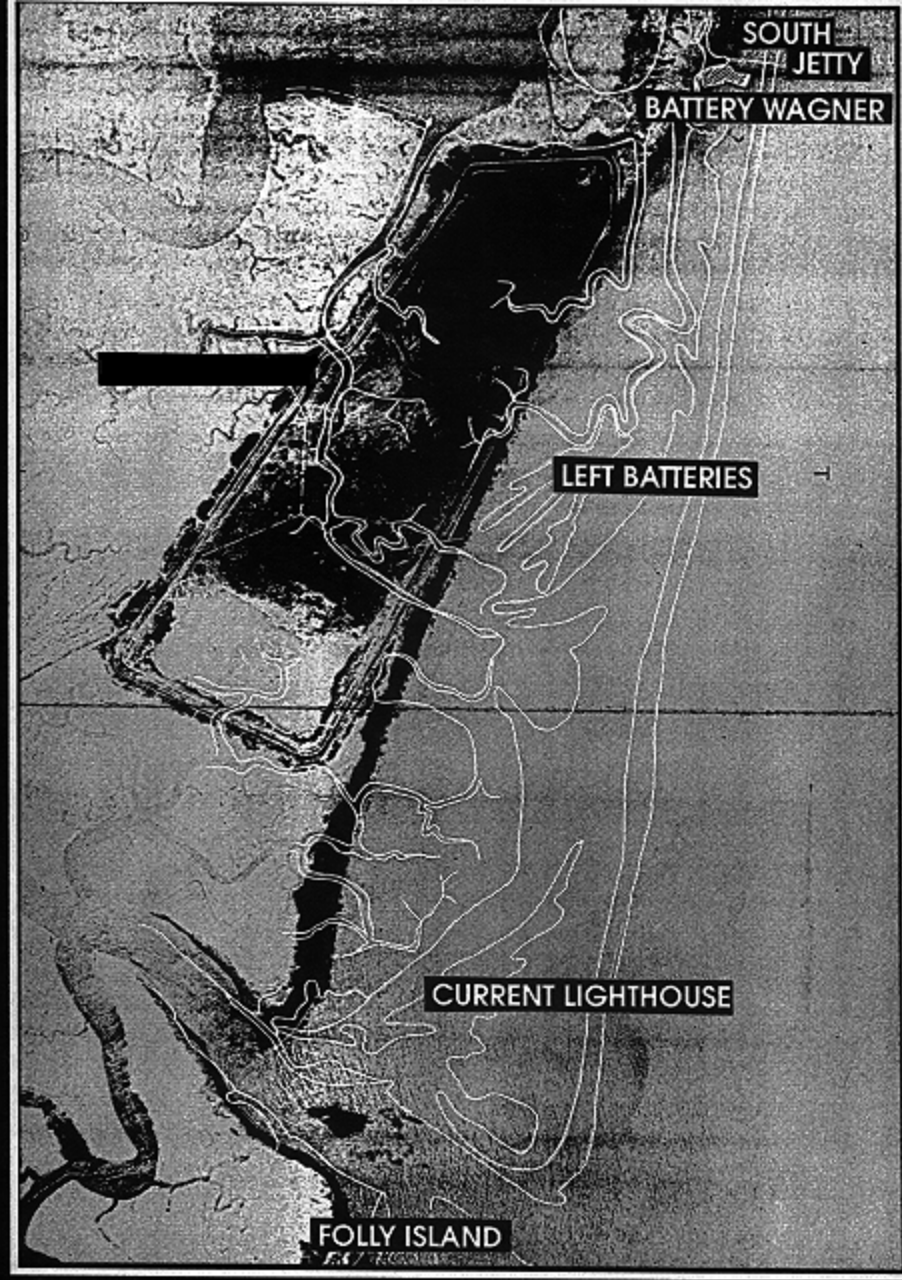

Figure 11. Reconstruction of Civil War fortifications on present day photograph of Morris Island (courtesy of Willis J. Keith, SC Wildlife and Marine Resources Department).

been recorded in these environments and the potential for marine resources (buried vessels, small boats, etc.) is relatively high. Prehistoric archaeological sites may include locales that have subsided since their original occupation and are now in marsh. Historic sites also may include lime processing sites (oyster shell mounds), landings, or causeways.

The general setting of the disposal site with respect to the Cooper or Wando River will provide some additional assessment of this potential. Islands such as those in Sites A, E, and J are likely to have been reworked by Cooper and Wando Rivers through time; comparisons of historic maps and photorevisions of modern topographic maps attest to the active modifications of these landforms. Thus, one could expect the potential for these islands to contain prehistoric cultural resources would be less than marshes that located on the margins of the river valleys (e.g., Sites B and C) or along secondary drainages such as Beresford Creek (e.g., Site G). Historic resources would be less likely to have been affected by the normal processes of these rivers given their shorter period of exposure; however, deposition and/or erosion could have buried or reworked historic structures or sites in a similar manner.

Potential for marine resources within the possible disposal sites was determined through consultation with staff archaeologists at the South Carolina Institute of Archaeology and Anthropology (Christopher Amer and Mark Newell). Underwater resources (principally wrecked vessels) potentially can exist in any of the underwater disposal sites (Sites L, O, P, and S) and some of the other locales (e.g., known wrecks of historic significance exist in or near Site N). Further, possible disposal sites containing larger creeks within tidal marsh also could contain wrecked vessels (principally small craft), and refuse deposits associated with historic residential locales could be expected in streams adjacent to such locales (e.g., 38CH1031 and 38CH1039 on Horlbeck Creek in Site H). Thus, areas not currently covered by spoil all possess some potential for containing submerged resources.

These considerations resulted in the following estimates of cultural resource potential for each site:

High Potential for Unknown Resources	Sites D and N.
Moderate Potential for Unknown Resources	Sites F, G, L, Q, R, S.
Low Potential for Unknown Resources	Sites A, C, H, I, M, O, P.
No Potential for Unknown Resources	Sites B, E, J, K.

These estimates of resource potential will be employed to assist in the assessment of potential effects to cultural resources for each site following a discussion of the kinds of effects that can be anticipated during the construction and operation of a disposal site.

DEFINITION OF POTENTIAL EFFECTS

Once the numbers or density of known and potential resources within each has been determined, an assessment of the potential of the construction and operation of each possible disposal site can be undertaken. However, one must also consider the nature of the effects that are anticipated to occur. Three sets of effects can be defined. These include:

actions undertaken to build the disposal site.

actions undertaken to operate or to utilize the disposal site.

impact of the active or abandoned disposal site on the surrounding landscape.

A brief summary of the kinds of activities that may affect cultural resources within disposal sites with respect to each of these aspects follows.

Development of a dredge disposal site will involve construction of dikes and preparation of the enclosed area. For the most part, construction occurs above grade (i.e., at the existing ground surface). However, some preparation of the area that supports the dike is necessary to produce a stable containment structure. This preparation should include the removal of organic materials (e.g., stumps, logs, root mats, etc.) from the area that will support the dike structure. This will likely result in below ground disturbances to depths of 1-2 ft on most upland locales. Such disturbances would result in severe disruption or complete destruction of cultural deposits that may be present within the construction zone. Dikes built on areas of marsh undoubtedly will require similar preparation (removal of soft muds overlying sand deposits?). Most intact cultural resources in marsh environments can be expected to occur beneath the fine muds that represent the surface of the marsh. Thus, the actual construction may not disturb such resources. preparation of the impounded area, particularly uplands, also may require the removal of timber and other organic debris. Similar impacts to buried cultural resources could be expected to occur in these areas as well. Only the underwater sites will require little or no modification to the areas designed to support a dike structure.

Once the site has been prepared, actual dike construction will involve the deposition of materials to form the containment structure. In most instances, this material will be taken from within the impounded area (for upland sites) or from previously dredged material (in or near existing disposal sites). Thus, none of the upland or marsh sites will require the excavation of borrow pits outside the projected impoundments. Underwater sites that require dikes (e.g., Sites L and S) will use newly dredged materials (generally coarser alluvium than sediments collected during maintenance dredging of shipping channels) collected during the preparation of new docking facilities (e.g., at the State Ports Authority "Terminal X" on Daniel Island or expansion of existing docking areas). Thus, actual construction should not result in significant "invasive" impacts beyond those noted for

site preparation. However, deposition of spoil materials will result in obfuscation of cultural resources that are buried beneath the impoundment structures, severely restricting access to resources that may have not been adversely affected by the actual construction activities. As noted above for existing disposal sites, resources buried under many feet of sediment are effectively destroyed since access will be extremely costly (if not impossible). The effects of the additional weight of the dike on deeply buried terrestrial resources also may be detrimental. Such deposition on underwater sites is not considered as detrimental by the SCIAA underwater archaeologists (Christopher Amer, personal communication 1992); however, access to underwater cultural deposits would be severely restricted by the construction of dikes on top of such resources.

Thus, construction of dikes and preparation of the impounded disposal area can be expected to produce a variety of adverse effects to cultural resources that may be present within the possible disposal site. Terrestrial resources appear to be more sensitive to these impacts than underwater resources; however, access to any sites buried under dikes will be severely restricted. In most instances, this restricted access will effectively prevent any future examination of the resource. Effects related to dike construction activities can be expected in Sites A, C, D, F, G, H, I, M, N, Q and R. Effects related to the preparation of impounded areas could be expected in Sites D, F, G, H, Q, and R. Sites B, E, J, and K involve modifications to existing disposal areas without expansion of the dike systems to incorporate previously undisturbed lands. Sites L and S will involve construction of underwater dikes; offshore Sites O and P involve no dike construction or site preparation.

Operation of disposal site will involve two sets possible effects. Primarily, any resources within the impoundment will be buried under many feet of dredged sediments. As noted for dike construction, the burial of cultural resources beneath such deposits effectively eliminates access to these resources and any significant information they may contain. The increased weight and moisture also will likely degrade any buried terrestrial resources within upland disposal sites. Possible impacts to buried resources also may occur during rehabilitation or stabilization of the dredged areas, when large ditches are excavated through the spoil to permit the release of water trapped in the dredged materials. If this excavation intrudes upon former ground surfaces beneath the spoil, adverse effects to buried resources could be expected. Once again, the effects on underwater resources buried beneath dredged materials appear to be less than those anticipated for terrestrial resources. Only Sites B, E, and K, incorporating completing existing disposal areas will not have no effect on cultural resources during their operation.

The construction and operation of a disposal site also will affect the setting or landscape surrounding the actual facility. The presence of a large containment structure has the potential to intrude upon the setting of historic properties within or adjacent to Charleston Harbor. Use of existing disposal sites, while creating similar intrusions, probably can be considered to produce less adverse effect since most have been in use or existed at the time that the historic properties in the Harbor were listed on the NRHP. New disposal areas that are near or visible to NRHP listed properties (e.g., Sites L, M, and N) may

produce such adverse effects. As an example, construction of disposal facility at Site M may intrude upon the setting of Fort Sumter. While the actual area included in the current National Park will not suffer impacts, the setting of the fort (i.e., at the mouth of the Harbor) may be degrading by the presence of a large earthen structure immediately south and west. Such a facility would reduce the "historic setting" within which present visitors to downtown Charleston and the Fort itself can view the property. Similar, use of Site L in front of Castle Pinckney may result in similar effects if the spoils generate the development of a marsh island that blocks lines of sight from the fortifications to the mouth of the Harbor, or appears to block such sight lines when the property is viewed from downtown Charleston. This would detract from the ability of a visitor to interpret the historic setting of Castle Pinckney.

Other effects that will occur during the operation of a disposal site include the physical activities involved in collecting and redepositing the dredged materials. The physical collection of the materials within the shipping channels of the Harbor undoubtedly creates adverse visual and aural effects to the NRHP properties that can be visited or viewed within the Harbor (e.g., Fort Sumter, Castle Pinckney, Fort Moultrie, downtown Charleston). These effects are considered to be minimal, however, since dredging of the Harbor has occurred throughout its history and viable alternatives or mitigative options to this activity do not exist. Obviously, disposal sites located further from known NRHP properties will have less effect than those adjacent to such properties. Site selection would appear to represent the best mitigative option to such impacts.

As noted above, possible disposal sites that have the greatest potential to produce adverse effects to the existing historic landscape of Charleston Harbor are Sites I, L, M, and N. Sites J, K, and S minimally may create similar effects; however, their greater distance from the NRHP properties in the Harbor suggest that these effects will be of little or no consequence.

ASSESSMENTS OF POTENTIAL EFFECTS

An actual assessment of the anticipated effects of the construction and operation of the nineteen possible dredge disposal sites on cultural resources can be undertaken once known and potential resources within or adjacent to the nineteen locales have been identified and the anticipated effects outlined. Basically, the kinds of anticipated effects are compared to the kinds of resources known or expected to exist within or near each possible disposal site, and a score assigned to that site based on each comparison. As noted in Chapter III, scores were assigned at four values (*0, 1, 3, 5*), representing no anticipated effects to extreme adverse effects. Three categories of resources were defined, with scores assigned for each site in each category. These categories included:

known NRHP listed properties.

known NRHP eligible or potentially eligible resources.

potential cultural resources.

The sum of the values assigned to each possible disposal site for its effects on the three classes of resources formed a composite score. Comparisons of these scores permitted the ranking of each site based on its potential to affect cultural resources through its construction or operation. Note that each class of resource was given equal weighting (i.e., raw values were added together to create the composite score). This assumes that all resources (NRHP listed properties, known NRHP eligible or potentially eligible resources, and unknown resources) have equal significance. While some argument can be made that resources possess different levels of significance (e.g., local, regional, or national), such distinctions will not permit adverse effects to any resources without some mitigative effort.

Table 6 provides a summary of values assigned to each possible disposal site, their composite scores, and their predicted potential to affect cultural resources. The scores assigned to each site are derived from the kinds of effects each site is expected to produce and the nature of resources known or expected to exist within it. Sites with lower composite scores possess a lower potential to affect cultural resources in an adverse manner; sites with higher scores have a greater opportunity to affect cultural resources.

A brief review of Table 6 reveals that Sites B, E, J, and K appear least likely to affect cultural resources (Score= 0/Rank= 1). These sites all incorporate existing spoil disposal areas, will require little new construction to permit their use, and are not located in areas that represent historic landscapes. These sites would appear the best choices for possible disposal locales with regard to cultural resources.

Sites A, C, O, and P appear to represent the second best choices of disposal sites (Score= 1/Rank= 5, see Table 6). As above, three of these sites incorporate existing disposal areas; thus, additional deposition will have less opportunity to affect any resources that may be present. The only new construction will occur in Site P (an offshore berm in front of Folly Island). While some submerged resources are likely to be present, consultation with the SCIAA underwater archaeologist suggested that any effects to such resources would not result in serious degradation. All of these sites are located well away from any significant historic properties or landscapes as well.

Sites G, Q, R, and S possess the next greatest opportunity to affect cultural resources (Score= 3/Rank= 9). The three upland sites (G, Q, and R) contain primarily hydric soils, suggesting that they possess only moderate potential for containing unknown cultural resources. Site S has some potential to contain submerged resources given its proximity to the principal docks on the Cooper River.

Site I possesses the next greatest opportunity to affect cultural resources (Score= 4/Rank= 13, see Table 6). Although incorporating primarily an existing disposal area, its

Table 6. Assessment of Effects to Cultural Resources for Possible Disposal Sites.

SITE	POTENTIAL TO AFFECT: NRHP LISTED PROPERTY	NRHP ELIGIBLE RESOURCE	POTENTIAL CULTURAL RESOURCE	SCORE	RANK
A	0	0	1	1	5
B	0	0	0	0	1
C	0	0	1	1	5
D	0	0	5	5	14
E	0	0	0	0	1
F	0	0	5	5	14
G	0	0	3	3	9
H	0	5	1	6	16
I	3	0	1	4	13
J	0	0	0	0	1
K	0	0	0	0	1
L	5	0	3	8	18
M	5	0	1	6	16
N	5	5	5	15	19
O	0	0	1	1	5
P	0	0	0	0	5
Q	0	0	3	3	9
R	0	0	0	3	9
S	0	0	3	3	9

0= No Effects 1= Minimal Effects 3= Moderate Effects 5= Extreme Effects

proximity to Magnolia Cemetery (an NRHP listed property) may result in some degradation of that resources historic setting. If these anticipated effects can be minimized or removed, Site I would possess a similar score/rank (1/5) as Sites A, C, O, or P.

Sites D and F possess the next greatest opportunity to affect cultural resources (Score= 5/Rank= 14, see Table 6). Site D will incorporate primarily marsh; however, its contact with uplands on Cainhoy peninsula encounters Cainhoy sands that have displayed a high density of sites in that area. Thus, dike construction along the uplands may have adverse effects on any sites present within the disposal area. Site F, though containing primarily hydric soils that possess low probabilities for archaeological resources, is traversed by Cainhoy Road, an historic roadway from Charleston to Moncks Corner. A ferry landing was present in or near Site F, providing additional opportunities for historic archaeological resources to be present.

Sites H and M possess a high potential to affect cultural resources (Score= 6/Rank= 16, see Table 6). Site H contains 18 known archaeological sites; 15 are eligible or potentially eligible for nomination to the NRHP. Site M, though incorporating tidal marsh, is adjacent to and visible from Fort Sumter (an NRHP listed property). The presence of a disposal site at this locale likely will result in adverse visual effects to the setting of Fort Sumter.

Site L also possesses a high potential to affect cultural resources (Score= 8, Rank= 18, see Table 6). This assessment is based on its proximity to Castle Pinckney (an NRHP listed property) and the visibility of the possible disposal site from downtown Charleston. The site also possess some potential to contain unknown submerged resources. A number of recorded wrecks are present near to this locale, and it seems likely that additional wrecked vessels may exist within Site L. Note that affects to Castle Pinckney could be minimized if the deposited materials do not extend above the surface of the Harbor. Elimination of these anticipated visual effects would produce a score/rank (3/9) for Site L comparable to that for Sites G, Q, R, or S.

Site N appears to possess the greatest opportunity to affect cultural resources at this time (Score= 15, Rank= 19, see Table 6). This site lies near an NRHP property (Morris Island light), may incorporate known NRHP eligible resources (two Civil War period wrecks), and also may affect as yet unknown cultural resources related to the Civil War activities on Morris Island.

CHAPTER V

SUMMARY OF MANAGEMENT RECOMMENDATIONS

Assessment of the potential for nineteen possible dredge spoil sites in and around Charleston Harbor to affect cultural resources resulted in the ranking of each site with respect to its potential effects. This ranking can be employed to form the basis for the selection of several of these sites for more intensive study to determine which locale may provide the best alternative to the use of existing dredge disposal sites on Daniel Island.

In general, use of existing dredge disposal areas or offshore sites appears to present the least opportunity to affect cultural resources. Any of Sites B (Naval Weapons Station), E (Clouter Creek), J (Drum Island), and K (Patriots' Point) would be considered the best sites to utilize; additionally, any of Sites A (Yellow House Creek), C (TC Depot), O (Ocean), or P (Berm Site) would represent the next best alternatives.

Sites G (Rodent Island), Q (Cainhoy Road), R (Point Hope Island), and S (Town Creek) also possess a limited potential to affect cultural resources. These locales all possess a moderate potential to contain unknown cultural resources at present.

The remaining sites all possess higher expectations to affect cultural resources. Sites D (Upper Thomas Island) and F (Lower Thomas Island) possess a high potential for unknown resources; Site H (Parker Island) contains 15 known NRHP eligible resources and may contain additional submerged resources in adjacent streams or creeks. Site M (Fort Johnson) possesses a similar likelihood to affect cultural resources due to its proximity to Fort Sumter. Similarly, use of Site I (Old Landfill) may intrude upon the setting of Magnolia Cemetery. Elimination of these possible visual impacts would significantly reduce the potential of this site to affect cultural resources.

Site L (Middle Shoal) appears to possess a extremely high potential to affect cultural resources based on its proximity to Castle Pinckney. However, if the disposal site remains below the high tide line, anticipated visual impacts to Castle Pinckney could be significantly reduced, or eliminated.

Site N (Morris Island) appears to possess the greatest opportunity to affect cultural resources. The site is located near a NRHP listed property, may incorporate NRHP eligible resources, and also may affect unknown cultural resources related to Civil War activities on the Island.

Once the number of possible sites has been narrowed to those locales that are most viable, more intensive cultural resources investigations of these particular sites should be undertaken. Such investigations should include the review of historic plats and property

records, intensive examination of upland areas, and reconnaissance of creek banks in tidal marshes. Underwater sites may require both physical inspection and remote sensing surveys. Coordination with the SCIAA Underwater Archaeology Division will be necessary to determine the levels of effort necessary to examine the underwater sites since some portions of the Harbor have been examined that may include portions of the possible disposal sites.

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